

MODEL 20000—LONBUILDER STARTER KIT

MODEL 20100—LONBUILDER DEVELOPMENT STATION KIT

LONBUILDER KITS SUMMARY



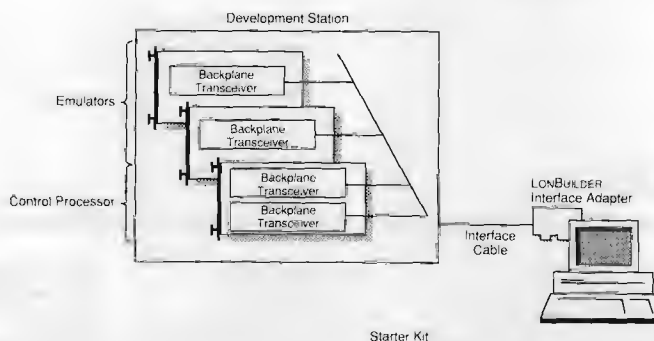
The LONBUILDER™ kits are the starting point for all developers of LONWORKS™ applications. The LONBUILDER Starter Kit contains everything needed to immediately begin development. The LONBUILDER Development Station Kit contains a complete network management and protocol analysis platform, but does not include programming tools for NEURON® C.

Both kits include the following components:

- ▼ *Development Station Hardware* The development station is an expandable hardware platform that includes 2 LONWORKS nodes, one for network management and one for protocol analysis.
- ▼ *Development Station Software* The development station software combines 3 major software development tools: the *LONBUILDER Integrated Development Environment (IDE)*, *LONBUILDER Network Manager*, and *LONBUILDER Protocol Analyzer*.
- ▼ *Interface Adapter* A PC compatible card that installs inside a PC/AT compatible computer to provide the interface between the PC and the development station.
- ▼ *Interface Cable* A 10' cable to connect the interface adapter to the development station.

The Starter Kit adds the following components to the Development Station Kit:

- ▼ *NEURON C Developer's Kit* Software tools for compiling, linking, and debugging NEURON C programs. Described in the NEURON C Developer's Kit data sheet.
- ▼ *2 NEURON Emulators* A pair of LONWORKS nodes for running and debugging NEURON C programs, and for testing prototype I/O and transceiver hardware. Described in the LONBUILDER Processor Boards Summary data sheet.





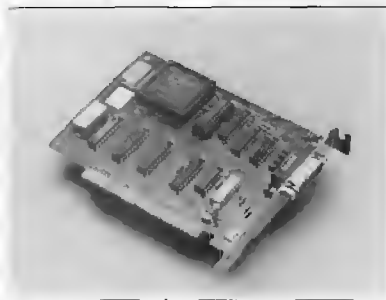
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**LONBUILDER
INTERFACE ADAPTER**

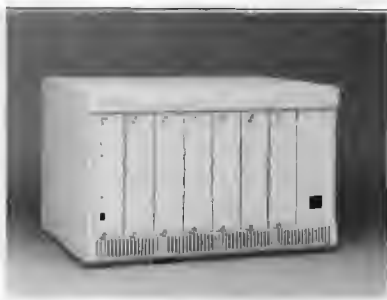
The LONBUILDER™ Interface Adapter provides the connection between the host PC and 1 to 4 development stations. It is a half-length board that plugs into a PC-compatible ISA bus. A DIP switch on the interface adapter allows user configuration of the I/O ports to avoid conflicts with other PC devices.

CONFIGURATION

The interface adapter and LONBUILDER software have been tested with the following PCs: IBM PS/2 Model 30 (ISA bus), Compaq 386, Toshiba T3100, Exerex Step 386, NEC 286, and Ergo Brick.

TECHNICAL SPECIFICATIONS

Power	5V (+/-5%) @ 0.5A
Size	99 mm x 133 mm x 11 mm (3.9" x 5.25" x 0.44")
Addressing	8 contiguous I/O locations with a user selectable start address of 200-3F0 hex
Default Address	310 hex

**DEVELOPMENT STATION
HARDWARE**

The Development Station Hardware provides an expandable development platform that supports up to six processor boards. The development station also includes a LONBUILDER™ Control Processor with 2 LONWORKS™ nodes for network management and protocol analysis. Up to four development stations may be connected to a single PC to support a total of 24 processor boards.

FEATURES AND BENEFITS

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|---|--|
| ▼ <i>Network management node</i> | Enables installation of nodes into networks during development |
| ▼ <i>Protocol analysis node</i> | Simplified testing of networks during development |
| ▼ <i>Accepts up to 6 processor boards</i> | Low-cost expansion |
| ▼ <i>Built-in backplane network</i> | Inexpensive networking between processor boards installed in the development station |
| ▼ <i>Built-in power supply</i> | Simplified breadboarding by providing +5V and +/- 12V to prototype hardware |

CONFIGURATION

The development station can be used with the built-in backplane network for implementing a network consisting only of the boards installed within the development station. Optional transceivers must be added for each node for interfacing with other media and for interfacing with nodes outside the development station.

Up to six processor boards may be installed in a development station. Additional processor boards can be accommodated by adding up to three additional development stations, each consisting of a development station enclosure and control processor.

TECHNICAL SPECIFICATIONS

Development Station Enclosure

Temperature	
Operating	0 to 40°C
Non-operating	-20 to 65°C
ESD Tolerance	< 15 kV
AC Power Input	100-120 and 200-240 VAC, 50/60 Hz
Regulatory Compliance	UL, CSA, TUV, FCC A, VDE A
Dimensions	279.4 mm x 444.5 mm x 317.5 mm (11" x 17 1/2" x 12 1/2")
Weight	12 kg (27 pounds)
Power Supply	5V at up to 100W; +/- 12V at up to 12W
Power Cord	IEC Connector U.S. /Japan—North American (NEMA 5-15R) Europe—Continental European (CEE 7) U.K.—British Standard (BS 1363)
Expansion Power	+5V @ 400mA per board; +/-12V @ 35mA per board

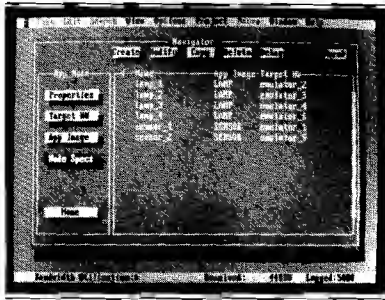
Control Processor

Operating Voltage	+5V +/- 5% @ 1A plus expansion power (powered from development station enclosure)
Expansion Power	+5V @ 400mA per board +/- 12 V @ 35mA per board
Dimensions	168 mm x 267 mm x 19 mm (6.6" x 10.5" x 0.75")
Processors	2 NEURON® 3150™ CHIPS with 32 KB of RAM each
NEURON CHIP Input Clock Rate	10 MHz or 5 MHz (software configurable)
Network Interface	LONBUILDER transceiver expansion board for each NEURON 3150 CHIP. 2 backplane transceivers included; other transceivers optional
PC Interface	10 Mbps link to LONBUILDER Interface Adapter or daisy-chain connection to another LONBUILDER Control Processor
Network Management Node Displays	Service LED and status indicator
Protocol Analysis Node Display	Network traffic indicator



LONBUILDER INTEGRATED DEVELOPMENT ENVIRONMENT

**LONBUILDER
INTEGRATED DEVELOPMENT
ENVIRONMENT**



The LONBUILDER™ Integrated Development Environment (IDE) is the software platform that supports all other optional LONBUILDER development tools. The IDE makes using the development station simple by providing a common user interface and database for automatically invoking and linking all LONBUILDER tools.

FEATURES AND BENEFITS

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|----------------------------|---|
| ▼ <i>Object database</i> | Ensures consistency between tools by providing a shared repository for the definitions of nodes and networks during development |
| ▼ <i>Project manager</i> | Simplifies development by compiling, linking, loading, and configuring multiple nodes with a single "build" command |
| ▼ <i>Integrated editor</i> | Speeds coding of NEURON® C applications by working with the optional NEURON C Compiler to automatically identify syntax errors found during compilation |

CONFIGURATION

The LONBUILDER software requires an IBM PC/AT compatible computer with 640 KB of real memory (512 KB available), 1.5 MB available extended or LIM 4.0 expanded memory, 10 MB available hard disk, EGA or VGA compatible graphics adapter, MS-DOS or PC-DOS 3.3 or 4.0, and Microsoft-compatible mouse. A software disk cache is recommended. LONBUILDER software is shipped on 1.2 MB 5 1/4" and 720 KB 3 1/2" diskettes.

The NEURON C Developer's Kit is required to compile and debug NEURON C applications.

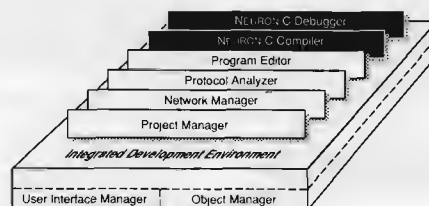
TECHNICAL SPECIFICATIONS


Project Manager Commands

Automatic Install	Install nodes that have changed since the last installation
Automatic Build	Compile, link, and optionally download all nodes that have changed since the last build
Automatic Load	Download all nodes that have changed since the last build
Install All	Install all nodes
Build All	Compile, link, and optionally download all nodes

Integrated Editor Commands

Cursor Movement	Move left/right/up/down/page up/page down Scroll up/down Move to equal indent up/down Move to beginning/end-of-block/line/file Move to top/bottom of window Move to marker Move to line number/column number
Basic Editing	Select/cut/copy/paste Delete character/word/line Insert control character Change to upper/lower case Undelete/restore line
File Commands	Open, save, save as, print, insert, write block
Search Commands	Find, translate, use macro, repeat
Option Commands	Set undo limit, marker display, autoindent, insert mode, backup mode, tab options
Project Commands	Automatic install, build, load Install all, build all Compile file
Macro Commands	Load, save, playback, record, edit
Window Commands	Close, go to, resize, zoom, next, previous
Help Commands	Display command summary
System Commands	Execute DOS command Exit



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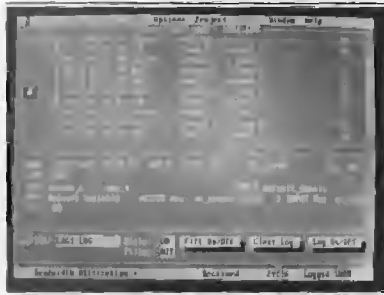
LONBUILDER NETWORK MANAGER AND PROTOCOL ANALYZER

LONBUILDER NETWORK MANAGER



The LONBUILDER™ Network Manager provides the tools required to define, configure, load, and control LONWORKS™ networks. Network configuration is simplified because all LONWORKS nodes have a separate application image and network image. The application image is defined by a node's application program, whereas the network image is defined at installation time by a network management node. Many nodes may share the same application image, but once installed, every node in a network has a unique network image. The network manager uses the network management node within a development station to download application images and configure network images. The network manager is also used to control nodes after installation.

LONBUILDER PROTOCOL ANALYZER



The LONBUILDER Protocol Analyzer simplifies network testing during development. It collects, time stamps, decodes, and displays network packets. The packets are displayed using the symbolic names defined by the node's application program. The protocol analyzer also provides snapshots of network behavior using a detailed network statistics display.

FEATURES AND BENEFITS

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|---|---|
| ▼ <i>Network definition and configuration</i> | Simplifies development of network configuration without changing application programs |
| ▼ <i>Network downloading</i> | Change application images over the network |
| ▼ <i>Network monitoring</i> | Test nodes in a network environment |
| ▼ <i>Packet filtering based on packet type, source node, destination node, and network variable</i> | Increased flexibility in analyzing network performance |
| ▼ <i>Integrated management and monitoring of LONBUILDER nodes and custom-built nodes</i> | Install and test custom hardware in a development network |

CONFIGURATION

Delivered with the LONBUILDER IDE. The NEURON® C Developer's Kit is required when using emulator nodes.

TECHNICAL SPECIFICATIONS

Network Manager Commands

Copy	Copy a network object
Create	Create a new network object
Debug	Invoke the NEURON C Debugger on an emulator node
Delete	Delete a network object
Go	Start execution on an emulator node
Halt	Halt execution on an emulator node
Install	Install a local or remote node
Load	Load a local or remote node
Load/Start	Load a local or remote node and start execution
Memory	View/change memory on a local or remote node
Modify	Modify a network object
Offline/Online	Take local or remote node offline or online
Reset	Reset a local or remote node
Reset/Halt	Reset and halt an emulator node
Test	Query status of a local or remote node
Wink	Send the "wink" network management command

Protocol Analyzer Commands

Clear Packet Log	Clear contents of packet log file
Clear Statistics	Clear network statistics
Create Packet Log	Create packet log file
Define Filter	Define packet filter
Delete Packet Log	Delete packet log file
Filter On/Off	Enable/disable packet filter
List Packet Log	List contents of packet log file
Log On/Off	Enable/disable packet logging
Display Statistics	Display network statistics
Update Statistics	Update network statistics